PAPERS ON AURAL AFFECTIONS.

No. II.

OTORRHŒA:

OR,

DISCHARGE FROM THE EARS;

ITS VARIETIES, CAUSES, COMPLICATIONS,

AND TREATMENT.

BY

W. DOUGLAS HEMMING, F.R.C.S.Ed.,

Fellow of the Medical Society of London; Assistant Surgeon, Central London Throat and Ear Hospital; Author of "Tinnitus Aurium, Its Causes and Treatment," "Aids to Forensic Medicine and Toxicology," "Aids to Examinations," "The Medical Student's Guide," Etc., Etc.

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PREFACE.

THE following pages, which are reprinted, with slight alterations, from THE STUDENTS' JOURNAL, constitute No. 2 of a series of Papers on Aural Affections.

Although, perhaps, not containing much that is new, they may be found worthy of perusal by students and practitioners, as giving briefly and succinctly a description of the forms, causes, and methods of treatment of a common, distressing, often much neglected, and frequently dangerous complaint.

W. DOUGLAS HEMMING.

GLENALMOND,

BOURNEMOUTH.

OTORRHŒA.

Of all the diseases of, or rather symptoms of disease in, the auditory apparatus, there are few more common, and at the same time more serious, than otorrhœa or discharge from the ears.

Into a complete and exhaustive account of all its varieties, their causes, complications, results and treatment I cannot pretend to enter within the limits of such a paper as the present.* My object is to give a short sketch of the conditions with which otorrhœa is more usually connected, its more common sequelæ and results, with a brief account of the methods of treatment which have been found of greatest value by aural surgeons. I shall endeavour to omit those minutiæ which would be of interest only to the specialist, and to confine my remarks to those points which are of practical utility to all engaged in the general practice of the profession.

* This paper was commenced with the intention of its being read before the Society of Students of Medicine, but circumstances prevented the author from finishing it before the session closed.

Otorrhœa is, as I have said, one of the most frequent symptoms of disease of the auditory apparatus which comes under the notice of the aural surgeon. It is also, in many cases, one of the most obstinate to treatment. I include under the term otorrhœa all cases in which there is a discharge issuing from the external auditory meatus, whether the origin of that discharge be from the external ear or from within the membrana tympani.

For convenience, cases of otorrhœa will be divided into two principal classes: 1. External Otorrhœa. 2. Internal Otorrhœa.

Under the former heading I shall include those cases in which the cause and origin of the discharge may be found in the external meatus, the membrana tympani remaining intact.

Under the latter heading will be considered all those cases in which the discharge originates within the membrana tympani, and in order to obtain an exit has caused a perforation of that structure. I would premise that it is necessary, in examining any case of discharge from the ear, that before using the speculum the auditory canal be freed from the discharge it contains by means of the syringe and hot water. This may seem a needless direction, but it is not so, as I have by no means unfrequently known cases where surgeons have endeavoured to treat otorrhœa without ever trying to find out whether the discharge came from the external meatus only, or originated in the deeper parts. This, of course, obviously cannot be determined unless the meatus be freed of matter so as to give the surgeon a clear field of view.

The forms of external otitis are not numerous, nor are they of so serious a nature as when the discharge has a deeper origin.

They may be divided into circnmscribed and diffuse external otitis, and these I will now consider in detail, giving causes, symptoms, complications and results, and treatment.

CIRCUMSCRIBED EXTERNAL OTITIS, or furuncle of the auditory meatus consists merely in the development of one or more boils in some part of the wall of the external auditory canal, the discharge from which constitutes a form of otorrhœa.

Causes.—The causes usually originating an attack of circumscribed otitis externa are similar to those which give rise to the eruption of boils in other parts of the body. Fatigue, with its conseqnent debility, and lowered condition of the system generally, is a common cause; sudden draughts of cold air, as from sitting near a railway carriage window, may set up an acuto inflammation, while disturbance of the digestive functions frequently co-exists, and may play some part in the etiology of the affection. One important fact in relation to furuncle in the auditory meatus is that the inflammation is rarely limited to one boil, but that a succession of them occurs, as one is cured another appearing. This renders the affection both painful and tedious.

Symptoms.—The first symptom attracting attention is pain, with heat, and throbbing in the ear, which extends over the side of the head. There is also usually some fever and restlessness. The intensity of the pain produced is quite remarkable, and apparently disproportionate to the severity of the affection.

Deafness is usually present, the amount depending on the extent of the swelling.

On inspection, the meatus is found swollen and red, especially at one particular spot which is exquisitely tender. The swelling is not unfrequently so great as entirely to prevent a view of the membrane being obtained, and the introduction of the speculum causes intense pain.

If the disease be left to itself the tender red spot usually snppnrates and discharges, with immediate relief to the patient, which relief, however, is frequently only temporary, as a fresh boil developes in some other part of the meatus with its train of similarly distressing symptoms. Occasionally, resolution takes place without the discharge of matter.

There are no particular complications connected with this form of external otitis.

Treatment.—If seen very early we may endeavour to prevent the boil coming to a head by the use of nitrate of silver or other abortive application, though such attempts will be rarely successful. The pain and throbbing will bo relieved by the application of leeches in front of the tragus. Poultices over the ear are nsually to be avoided as they frequently cause an extension of the inflammation. If nsed they must be made small enough to be inserted *into* the meatus. Hot fomentations and the application of steam are very soothing. The great remedy, however, consists in early and thorough incision of the abscess under a good illumination. I may here mention that no operations should ever be nndertaken upon the ear except under thorough illumination, obtained by means of the ordinary laryngoscopic reflector and a speculum. The relief afforded by incision is immense, and a free nse of the knife to the first boil not uncommonly suffices to prevent the recurrence of others. After incision the canal must be thoroughly cleared of discharge by means of the syringe and warm water, the nse of which should be continned twice or thrice daily as long as any discharge continues. Between the syringings from ten to fifteen drops of a warm alkaline, solution such as bicarbonate of soda, ten grains to tho onnce, may be instilled into the meatus. I would here note that ALL solutions applied to the ear should be warmed.

Constitutional treatment is of by no means secondary importance. A saline aperient should be administered at the outset, such as sulphate of magnesia, and this may favourably be combined with iron. Subsequently iron and quinine and iodide of potassium will be of use. Granulations sometimes remain after furuncle, and these should be touched with nitrate of silver, if found to be increasing in size.

It will be seen that this is not a serious affection, but the great pain which it causes, and the tendency it has to persistence, by the formation of successive boils, render its prompt and successful treatment peculiarly grateful to the patient.

Diffuse External Otitis, or diffuse inflammation of the external meatus, differs only from the last-named affection in its extent, and it may be either acute or chronic.

Causes.—These may be either constitutional and due to gout, scrofula, or sypbilis, or local. Diffuse inflammation sometimes appears as a result of circumscribed inflammation, or it is frequently caused by irritation of the ear. This irritation may be set up by the presence of a foreign body (though it more frequently results from injudicious and violent attempts at the removal of such body), by the introduction of irritating substances—tobacco, eau de cologne, &c., &c., for remedial purposes, by the use of pins, ear picks, aurilaves and other barbarous implements. Draughts of cold air may act as an exciting cause, some skin affections, eczema, erysipelas, &c., may extend from the auricle into the meatus and set up inflammation, while the exanthemata which, as we shall see further on, are frequent causes of suppurative disease in the middle ear, may also set up inflammation in the external meatus.

Symptoms.—The most prominent symptoms are pain, tinnitus, and deafness. The approach of the disease is usually heralded

by a sensation of itching, which, causing the patient to scratch the spot with some instrument, increases the inflammation.

In some cases of diffuso inflammation of a chronic character the discharge from the ear is the first symptom to attract attention, neithor deafness, pain, nor tinnitus being present.

In general, however, the subjective symptoms of diffuse inflammation differ little from these of the circumscribed form.

Examinatien reveals swolling of tho walls of the moatus, which are coated with a greyish white purulont layer. If this be removod by tho syringe and warm water, the skin is found to be softoned, excoriated and ulcerated in places.

The swelling is often so groat that a view of the membrane cannot be obtained. In such cases tho condition of the middle ear must bo ascertained, by inflation, by Politzer's or Valsalva's methed, or by the use of the Eustachian catheter.

The discharge, which may ceme eithor from soveral points, or only from one, consists, at first, of colourless or bloody serum, which terminates in a few days in a copious purulent discharge. The amount of serum in the early stages is often quite remarkable.

Tho duration of tho disease varies, but it is ofton vory chronic. Cases are net unfrequently seen, especially in hespital practice, where the discharge has oxisted ten, twenty, or even thirty years, and semetimes even in such casos the structuros of the ear do not seom to have materially suffered. Inasmuch, however, as tho integument of the bony meatus is also its periostium, an inflammation in this region becomes necessarily a periostitis, causing very great pain, and, perhaps, resulting in caries, moningitis, corebral abscess, &c. Those results I shall now spoak of under tho head of complications.

Complications.—Tho principal complications of a diffuse external etitis are—1. Chronic inflammation of the membrana

tympani. 2. Perforation of that structure. 3. Inflammation of the middle ear. 4. Aural polypi. 5. Mastoid abscess. 6. Parotid abscess. 7. Osteoporiostitis of the superior wall of the meatus, giving rise to meningitis and cerebral affections:—

1. Inflammation of the membrana tympani is almost always found in acute external otitis, the dermoid layer of the membrane being continuous with the lining of the meatus. The inflammation, however, not unfrequently extends to the deeper layer of the membrane, and causes ulceration of that structure. The membrane when examined, after removal of pus from its surface, appears yellowish, opaque, dull, and thickened, with vascular injection about the handle of the malleus. Ulcerations of this structure usually terminate in—

2. Perforations of the membrana tympani. These may be single or multiple, and vary much in seat, size, and form. Examination generally reveals them to the view, but if not visible to the eye, their presence may be ascertained by the use of the Valsalvan or Politzer method of inflation. If a perforation be present, the air will be heard to pass through the membrane with a squeaking, rushing, and gurgling sound, which, once heard, is not easily forgotten. The perforation of the membrane opening a communication between the external and middle ear, the inflammation frequently extends to the latter, and sets up a purulent middle ear catarrh; complication No. 3. Of this I shall speak more fully when I come to consider internal otorrhœa.

4. Aural polypi.—Those are more frequently the result of a suppurative process in the middle ear, of which I shall speak presently, but they may also be found in connection with a chronic purulent inflammation of the auditory canal. When they are the result of long continued suppuration in this region, they are not usually of large size, but are more of the nature of

granulations, appearing as small fleshy pimples, of a red colour, and with a sessile or pedunculated base.

The distinction between polypi and granulations is one of degree, and not of kind, authors calling the same growth in its early stage, and when small, a granulation, and in its later and larger stage, a polypus.

These granulations, or polypi, are found implanted on the walls of the meatus, generally in the vicinity of the membrana tympani, or on the dermoid layer of that membrane itself. The determination of the existence of polypi and granulations is easily made by means of the speculum and a good light (the meatus having been first cleared of discharge by the syringe and warm water), and their point of origin may be ascertained by means of a probe.

Of the varieties of polypi, their structure, modes of treatment, &c., it will be more convenient to speak when considering internal otorrhœa.

In the complications I have hitherto mentioned, the inflammation has not penetrated deeper than the cutaneous layer, but I shall now proceed to consider the effects produced when the deeper structures are affected. When this is the case, and the inflammation reaches the periosteum, the tissue becomes detached, the pus burrows under the fibro-cartilage, and into some neighbouring part, the region involved corresponding to that wall of the osseous meatus first affected.

Probably the most common of these complications is abscess over the mastoid process. This must be distinguished from suppuration in the mastoid cells themselves, which is usually consecutive to suppuration of the middle ear.

5. Abscess over the mastoid process occurs when the periostitis affects the posterior wall of the auditory meatus. In the course of an ordinary otitis, the patient is seized with severe pain,

spreading over the side of the head, and accompanied, in some cases with jactitation, delirium, &c., the discharge being very likely, at the same time, suppressed. In two or three days an œdomatous, ill defined swelling appears in the mastoid region, sometimes extending to the parietal and temporal regions, or the whole side of the head. Occasionally, at this time, active antiphlogistic measures may induce resolution, more usually, however, at the end of about a week, fluctuation becomes evident. If the abscess be incised or opens spontaneously, exploration with a probe will show that the bone is denuded, and yet when the contents of the abscess have been discharged recovery usually takes place quickly. If, however, such discharge be too long delayed, the bone, perpetually bathed in pus, becomes necrosed, and a troublesome fistula is produced, cured only after the throwing off of sequestra.

6. Parotid abscess. When the osteoperiostitis attacks the anterior wall of the meatus, a parotid abscess may be produced, but it is much rarer than mastoid abscess. The symptoms consist of pain, spreading towards the temporo-maxilliary articulation, with subsequent swelling and fluctuation in the parotid region. Unless early incision be practised the vascular and nervous structures of this region may become involved with somewhat serious results.

If the superior wall of the meatus be the one affected by the suppurative process, we may have the complication which I number 7. In this case the relations of the superior wall with the cerebral cavity come into play. In children especially is this complication likely to be a grave one, as the plate of bone separating the auditory meatus from the skull cavity is extremely thin. Many cases are reported by authors of meningeal and cerebral affections, consecutive to simple external otitis. The fact of these cases renders it extremely necessary

that in all instances of cerebral affections in children, without obvious cause, the ear should be carefully examined. Such examination may show an inflamed wall of the meatus, a free incision into which, giving exit to pent up discharge, may result in a disappearance of alarming symptoms and an unhoped for recovery. I would, therefore, strongly impress on my readers the advisability of examining the ear in all obscure cases of cerebral or meningeal trouble in children.

Treatment.—With respect to the treatmont of chronic otitis externa and its complications, I will say at once that the first essential in the treatment of all cases of otorrhœa, is cleanlinoss. This can only bo insured by frequent and thorongh syringing with warm water. Without this all attempts at stopping the discharge will be fruitless; and astringents, locally, with the internal administration of the whole range of tonics, &c., will be employed without avail.

Here I may remark that our efforts should always be directed to causing the cessation of the discharge. Patients will often tell us that they have been advised not to attempt to stop the discharge for fear of "driving it into the brain." I am aware, however, of *no* circumstances under which it is advisable not to use our best endeavours to cause a cessation of an otorrhœa.

Should a caso of diffuse inflammation of the canal come under our notico in its early stages, we may endeavour to subdue the inflammation by tho use of leeches, and if these be unsuccessful, by freo scarification of the affected spot.

The swelling and pain continuing, warm water should be applied, not by means of the syringe, but in a continuous steady stream, by the aid of the aural donche.

If the pain be very severe, anodynes may be added to the water, such as laudanum and morphia.

Solid poultices, and such applications as carrots, fat pork,

oils, tobacco, &c., frequently used by patients should be discouraged.

When the discharge becomes thick and purulent, the necessity for frequent syringings, previously alluded to, arises. Astringent drops, such as those of sulphate of zinc, with tincture of opium, may be inserted in the intervals of syringing. The following is a good form: zinci sulph. gr. 5, tinct. opii. m. 20, aquæ distill. ad. 1 ounce. Ten drops, four times daily, in the ear, warm.

For syringing out the ear, as the discharge is frequently offensive, a weak solution of permanganate of potash is very valuable. Lead, copper, alum, nitrate of silver, and other astringents may also be employed.*

Granulations are best treated by the application of chloro-acetic acid, two or three times a week. Polypi will require removal, and subsequent touching of the point of attachment with chloro-acetic acid.

Besides these local measures, inasmuch as most cases of chronic external otitis are connected with some defect in the constitutional condition, general remedies must be employed. With cachectic and scrofulous children, the use of iron and cod liver oil is essential, while the gouty or syphilitic diatheses must be combated with their appropriate remedies. The diet

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* In a paper read before the recent meeting of the British Medical Association, Dr. Löwenberg, of Paris, expressed the opinion that fungous ear disease was frequently produced by organisms present in the astringent solutions applied to the ear in otorrhœa. The free use of antiseptics for syringing will probably prevent this. At the Central London Throat and Ear Hospital, where antiseptics are always prescribed, no such case has yet occurred.

and the condition of the bowels must bo carofully rogulated, and everything done to bring tho system into a healthy condition.

With regard to tho treatment of tho complications, I need not say much. If ostoo-poriostitis of tho moatus occur, the painful and swollen point must be incised. Abscesses must be openod and a free exit given to all collections of pus. Early incision is ospecially necessary in mastoid and parotid abscess.

I now come to suppurative inflammation of tho middle ear, of which there are two forms, acnte and chronic.

Acute Purulent Inflammation of the Middle Ear.

Causes.—The most frequent causes of this affection are cold, violenco, the oxanthemata and whooping cough. In the case of cold, the affoction frequently commonces by oxtonsion from a throat affection through the Eustachian tube. Cold water bathing, when the water is allowed freo access to the meatus and membrane, is by no means an unfrequent cause. Of the connexion of the exanthemata, especially scarlet fever, with otorrhœa, all of you must bo well aware, and it should make practitionors ospecially watchful for ear complications in the conrse of such diseasos. Hinton was strongly of opinion that if greater care were bestowed upon tho ears in scarlatina, the mortality from that disease might be lessened. At any rato, it is certain that many cases of chronic otorrhœa, ending in cerebral abscess, meningitis, or somc other of its fatal consequences, might have boen nipped in the bud by prompt troatment when in the acnte stage.

Symptoms.—These commence with itching and tickling in tho ear and Eustachian region, and a sonse of fulness with tendernoss in the maxillary joint, vertigo, tinnitns, and deafness. Pain soon supervenes, which becomos agonising in character, cansing the patient to roll about in frenzy, and even

shriek from the suffering. In the case of children, convulsions are not uncommon, which are apt to mislead in the diagnosis, tending to a suspicion of brain disease.

At the early period the hearing may be even abnormally acute, but as the disease advances the function becomes impaired, and when pus is fully formed, there may be considerable deafness.

Examination of the membrane, if made at the early period of the disease, will show congestion of that structure, and as the inflammation increases the membrane will appear of a deep coppery colour. When pus is formed, there will be bulging of the membrane, which has a yellowish, or greenish yellow, soddened appearance. Soon after this, the drumhead probably ruptures and gives exit to the pus, with immense relief to the pain. When this rupture does not take place, and the pus finds no exit by the Eustachian tube, it may pass through either the tegmen tympani or mastoid cells, and thence to the brain, producing fatal results.

Consequences and Complications.—There may be, occasionally, extension of the mischief to the brain, or its membranes, as just observed; but the most usual result of acute purulent inflammation, if not subdued, is the production of a chronic internal otorrhœa, or chronic purulent inflammation, the consequences of which are numerous and serious, and will be considered presently.

Treatment.—This must emphatically be antiphlogistic. If we see the case early enough, we must endeavour to prevent the formation of pus, by the employment of leeches in front of the tragus, or over the mastoid. Saline purgatives and diaphoretics should be administered.

If the inflammation advances, the employment of the warm douche is necessary, a constant irrigation of the ear with

warm water being kept up. This, in some cases, may bring about resolution, while, if suppuration has commenced, it will hasten the process.

Early incision of the membrana tympani, repeated if necessary, is advisable, and need not necessarily be delayed until there is evident bulging of the membrane. When performed, the best situation for it is in the postero-inferior quadrant The incision of the membrane allows free exit to the pus, and gives great relief to the symptoms.

Chronic Purulent Inflammation of the Middle Ear, the most common form of otorrhœa, is almost always a result of the last-named affection. An acute attack has been neglected, or imperfectly cured, and chronic discharge is the result.

Its *causes*, therefore, are the same as those of the acute form —viz., exposure to cold, traumatic influences, the exanthemata, and diphtheria. In the last-named disease, the purulent inflammation of the ear following it, is apt to fall at once into the chronic form without passing through an acute stage—or that stage at any rate may pass unnoticed.

The majority of cases of chronic purulent inflammation commence in childhood, but it is astonishing the number of years that a discharge from the ears will be allowed to continue before advice is sought for it. This is partly owing to the fact that a belief has sprung up in the public mind, and has in many cases been fostered even by medical men, that discharges are beneficial outlets, and should not be checked.

I cannot protest too strongly against such an idea, and would again urge the necessity of always using our best efforts to stop an otorrhœa. If it be allowed to go on, it is almost sure, sooner or later, to produce serious or fatal effects.

A very superficial glance at the literature of aural surgery

will suffice to show the fearful results of neglected purulent inflammation of the middle ear. As an example, I will merely say that Dr. Burnett, of Philadelphia, in his valuable treatise on the ear, recently published, from which I have freely drawn in writing this paper, gives a bibliographical list of no less than 89 articles referring to the fatal results of neglected otorrhœa, caries of the mastoid, &c., published in medical journals between the years 1864 and 1876.

The persistence of an otorrhœa is frequently evidence of a strumous, or scrofulous diathesis, and discharge from the ear is by no means uncommon in the course of pulmonary phthisis, towards the later stages of that disease. Different views are held with regard to the origin of the otorrhœa of phthisis; some consider it as primary, and due to the presence of caseous and tubercular deposits in the petrous bone and mastoid cells. Others believe that it is not tubercular in its origin, but due to propagation of inflammation from the throat, through the Eustachian tubes.

Otorrhœa is also observed in some cases of syphilis, either in the secondary or tertiary period; in the latter case it is probably connected with carious affections of the petrous bone.

Symptoms.—The principal of these are deafness and purulent discharge from the meatus, the latter being frequently the first symptom attracting attention, while in other cases the deafness induces the patient to seek advice, the discharge being considered as of no consequence.

On examination, the meatus is generally more or less swollen, red, and soddened, and contains pus. On the removal of this by the syringe, the membrane will be seen to be perforated, or almost entirely absent, and the red, inflamed wall of the tympanum is visible beyond. The ossicles may be absent, their attachments having been destroyed by the suppurative process,

and the bones themselves carried off in the discharge. Hospital patients will occasionally bring the ossicles (which thoy generally call little stones), carefully wrapped np in paper for the surgeon's inspection.

Complications.—These are both numerous and grave, nor will this fact seem a surprising one when the rolations of tho tympanum, and the slight barriers which separate it from vital organs are takon into consideration.

Burnett says, "Chronic purnlent inflammation of the middle ear tonds to the production of—1. Pormanent hardnoss of hearing and deafness. 2. Epiloptiform, and other norvous manifestations. 3. Granulations, and polypi in the car. 4. Ulceration of the mucous mombrane of the tympanic cavity, periostitis, ostitis, caries and nocrosis of any, or all, of the parts of the temporal bone, ard portions of the adjacent bones; inflammation of the meninges and sinuses of tho brain, ombolism, cerebral abscess, pyæmia, and death."

To consider all these complications in full wonld be, in a paper of this kind, neither possible, dosirable, nor necessary. The fact of their occurring as complications of aural disease is here remarkod in order that in any case of snch affections, whose origin cannot bo satisfactorily accountod for, the practitioner may remembor that tho cause may exist in the middle ear, and may investigate that region accordingly.

1. The hardness of hearing and deafness met with as a result of purnlent inflammation, is caused by the destruction of the sound-conducting parts of the ear. Froquently, under troatment, this may be improved; a perforated membrano will ofton heal when the tympanic cavity has boen brought into a hoalthy condition. There does not soom to be any definite rolation between the amount of deafness and tho oxtent of the perforation of the membranc, but the hardness of hearing appears to depond

more upon the amount of implication of the deeper parts, the stapes, and the fenestra ovalis, and fenestra rotunda. It is in cases where the membrana tympani, and, perhaps, one or more of the ossicles have been destroyed, that the employment of the artificial membrane, either in the form devised by Toynbee, or merely in the shape of small pellets of cotton wool, as used by Yearsley, is found of value in restoring the hearing.

It is probable that the support given to the stapes, and the consequent regulation of its movements, in relation to the fenestra ovalis, is the cause of the improvement of hearing produced by these means.

2. Epileptiform, and nervous phenomena in connection with chronic purulent otitis media.

The nervous affections produced in internal otorrhœa are of various kinds; there may be epileptoid seizures, irritation of the chorda tympani, with permanent facial paralysis, anomalies of taste, disordered salivary secretion, *temporary* facial paralysis, affection of the gait, vertigo, &c., &c.

In those cases where seizures of an epileptiform character occur, the affection is usually of long standing, and has been accompanied by pain, the formation of granulations, large perforations, and very foul discharge.

Similar epileptoid attacks are sometimes seen in cases of post-nasal catarrh, where the mouth of the Eustachian tube becomes occluded, leading to retraction of the membrane, pressing in of the stapes, with increase of labyrinthine pressure, and consequent unconsciousness.

Hemiplegia has been noticed by Roosa in two cases, coincident with chronic and neglected middle ear suppuration.

Temporary paralysis of the facial nerve may appear in the course of internal otorrhœa, while if there be necrosis of the temporal bone, such paralysis is apt to be permanent.

Other nervous phenomena, occasionally found in cases of internal otorrhœa, consist in anomalies of taste and salivary secretion, vertigo, and certain reflex psychoses. Into a full description of these, limited space forbids my at present entering, nor do I considor it advisable to do so in a paper liko the present.

3. Granulations and polypi. These formations are a common result of chronic and neglected suppuration of the tympanum. The granulations may bo found either on the walls of the meatus, on the membrane, or attached to tho mucous membrane of the tympanic cavity. They give a red roughened appearance to tho part on which they are developed, and should always be looked upon as embryo polypi.

Polypi themselves may be divided into four classes. 1. Mucous. 2. Fibrous. 3. Myxomatous, and 4. Angiomatous. The two latter kinds have oach been observed but once. The most common variety is the mucous.

Polypi offer considerable varieties in size, colour, shape, and consistence. They aro sometimes so small as to require careful examination with the specnlum for their detection, while in other cases they are so large as to project beyond the external orifice of the meatus in the form of round, red, fleshy heads. In shape they are usually somewhat pear-shaped, of a consistence varying from the jelly-like softness of a myxoma, to the dense hardness of a fibroma, and are always covered with epithelium, that on the outer exposed surfaces assuming the character of epidermis. Their most usual seat of growth is the tympanic cavity.

No very special symptoms are produced by the presence of polypi, but their existence should always be suspected and looked for in cases of chronic otorrhœa. Hemiplegia, hemicrania, vertigo, and other symptoms, have been described as

results ef pelypus, but such symptems are net in any way characteristic ef these grewths.

The pelypus is often unperceived by the patient, who is ignerant of its existence until it is feund by the surgeon, to whem he has applied simply en acceunt ef the aural discharge.

4. Ulceratien ef the muceus membrane of the tympanum is a by ne means unfrequent result ef a chrenic suppurative process in that cavity. The lining membrane of the tympanum being essentially a periosteum the inflammatien often extends te the periesteum of the osseeus meatus, and gives rise te the fermatien of exestesis. The inflammatien may alse attack any of the walls ef the tympanic cavity, setting up estitis and caries. When the anatemical pesitien ef the tympanum is censidered, the gravity of these precesses will be evident. A very commen directien fer the extensien ef the inflammatery precess is towards the mastoid cells, where there is set up periestitis ef the euter surface, congestien and inflammatien ef the muceus membrane ef the cells, with subsequent caries and chrenic suppuratien, followed by meningitis, thrembosis of the sinuses ef the brain, embelism, pyæmia, and cerebral abscess.

The symptems ef masteid periestitis are great pain behind the ear, redness, swelling, and tenderness. Slecp is eften prevented by the acuteness ef the pain.

When the inflammatory procoss has gene se far as te cause caries ef the mastoid cells, the symptoms beceme serieus. The mastoid rogion becemes very tender, the skin red and boggy, pain sheots ferward te the brow and backward te the ecciput. The pain undergees oxacerbations, especially at night. The system soen suffors, tho pulse becemes rapid, the appetite is lest, nausoa and vemiting ensue, and the tonguo is dry and reugh. Then the mental pewers beceme affected, fever sets in, and stuper and cema usher in the fatal terminatien.

"The best that nature can do in inflammation within the mastoid cavity is to break down by necrosis the outer mastoid table, or to force the pus through a natural dehiscence which might happen to exist in a given case. And in some instances it would seem that nature thus gave release to the products of inflammation in the mastoid cells. But in the vast majority of cases such relief cannot reasonably be hoped for, and the natural result then is an erosion of the thin wall of the lateral sinus, or a passage of the inflammatory process to the meninges, and the sinuses of the brain, by the vascular communication existing between the mastoid cavity and the former structures. Thrombi may entirely fill the lateral sinus on the side of the affected ear, and extend into the corresponding petrosal sinus. These may undergo suppuration and gangrene, and give rise to embolism and blood poisoning. A deep-seated abscess, not unfrequently forms in the muscles of the neck near the affected mastoid cavity. Cerebral abscess is not an uncommon result of mastoid disease, as well as of chronic purulent disease in the tympanum."*

These then are the complications ensuing when the suppurative process in the middle ear extends backwards; when the extension takes place inwards there ensue affections of the labyrinth and auditory nerves.

Cases where the carious process attacks the cochlea, leading to necrosis and exfoliation of that or other parts of the labyrinth are rare, and usually only occur when the chronic suppuration has existed for a great number of years. There is suddenly some pain in the ear, swelling about the auricle, fever, constipation, nausea, vomiting, vertigo, intense tinnitus, and total deafness, followed by paralysis of the extremities, and of the facial muscles on the affected side.

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* Burnott, loc. cit.

Delirium, coma, and death may now supervene, or, on the other hand, the symptoms may be suddenly relieved by a profuse purulent discharge from the ear, and the patient will recover; permanent and absolute deafness, indicating destruction of the labyrinth, remaining, with some discharge.

Loose sequestra will probably be found now in the external meatus, which on examination will be seen to consist of the cochlea or other parts of the internal ear. Where a large portion of the labyrinth is thus thrown off, facial paralysis is found as a characteristic symptom, and may be permanent.

Extension of the suppurative process from the tympanum upwards through the tegmen tympani, gives rise to cerebral abscess, which indeed more frequently results from disease of the middle ear than from any other single cause. Caries of the roof of the tympanum is not necessary for this as there may be normally a gap in the bone in this situation. The cause of the extension of the suppuration in this direction is probably the non-escape of pus through the membrane, or the Eustachian tube. The extension usually takes place by a direct communication between the diseased mastoid or petrous bone and the brain substance, through the meninges. Into the symptoms and treatment of cerebral abscess itself I shall not, of course, here enter at length, as these are fully given in any good text-book of medicine. The symptoms of an extension of the process from the tympanum to the brain are sometimes chill and convulsions, nausea or vomiting, at others, increased pain in the ear, soon followed by paralysis, coma, and death; while, in some cases, there are no symptoms leading to a suspicion of cerebral complication.

The pus entering the circulation through the mastoid veins, or lateral sinus, as the result of tympanic suppuration, may set up pyæmia and metastatic abscesses, lobular pneumonia, and gangrene of the lung.

Extension through the anterior wall of the tympanum, with caries and necrosis of the bone may cause ulceration of the internal carotid artery. This complication has been most frequently observed in aged or cachectic patients, such as those suffering from phthisis.

Extension outwards causes ulceration and perforation of the membrana tympani, which is one of the most favourable results, giving, as it does, free exit to the pus. It is usually, in cases where this has not taken place, that the other serious complications occur, from the pus, unable to get out, making its way in other directions, and complicating vital organs. It is by the extension ontwards of the inflammation that periostitis of the meatus may be set up causing exostosis, or inflammation of the mucous membrane, giving rise to granulations and polypi in the same part.

Such are the principal complications of chronic purulent inflammation of the middle ear. The account of them is necessarily brief and imperfect, but my great object is to draw attention to the fact that such serious affections may be due to anral disease, and thus induce my readers to give attention to the ear when any such cases come before them. Cases are too frequent, even in the present day, in which patients are allowed to die from affections really originating in the ear, without that organ ever having been even examined, much less submitted to any treatment.

Treatment.— The first, and certainly most important requisite, in the treatment of chronic tympanic suppuration consists in the complete removal of all the products of the morbid process. For this purpose the *proper* use of the syringe and hot water is essential. I emphasise the word proper, because one frequently sees patients who affirm that they syringe their ears daily, in whom, on examination, the canal and tympanum are found full of secretion.

This is because the syringe has not been used properly. As Roosa says, "it is generally thought that any person can syringe an ear, when the facts are that no patient can properly cleanse his own ear, and almost everyone requires instruction before he can syringe the ears of another." It is, therefore, necessary that the surgeon should himself cleanse the patient's ear, and then instruct some member of the family, and see that his instructions are understood and carried out.

The medical man should himself attend at least twice a week, an attendant performing the duty of cleansing on the intervening days. After the syringe has removed as much of the secretion as possible, the ear being filled with warm water and the meatus closed with cotton wool, inflation by Politzer's method should be practised, the syringe again used, and the ear examined. Any small portions of inspissated secretion still remaining may be removed by means of a cotton-holder.

The ear having been thus thoroughly cleansed, an astringent solution may be poured into the ear, warm, and allowed to remain for some minutes.

With regard to the astringent to be employed, the choice does not seem to be a matter of great importance. Some authorities recommend one and some another. Sulphate of zinc is very generally applicable, though in long standing cases, nitrate of silver may be preferable. The strength of the zinc solution should be from 1 to 4 grains to the ounce, but the nitrate of silver must be much stronger. From 40 grains to the ounce upwards is the strength usually required. The tympanic cavity may be very thoroughly cleansed, as advised by Hinton, by using a syringe with a large nozzle which fits tight into the meatus. The stream is thus forced through and escapes by the Eustachian tube, and out through the nostril. For this purpose, solutions of carbonate of soda (gr. 20 to 1 ounce) may be

employed. Care is necessary in using this method of syringing, as giddiness and vertigo are sometimes produced by it.

Some authors use powders, blown into the ear; amongst those, one which I have fonnd usoful, consists of salicylic acid and carbonate of magnesia, 20 grains of tho former and 40 of the latter. After thoroughly cleansing the oar of socretion, this powder may be blown in, and frequently with satisfactory rosults. Solutions of alum and of acetate of lead are also valnable; if one astringent does not have an effect some other may be substitnted for it, until the desired result is obtained.

In some cases of porforation of the drnmhead and deafness, the use of the artificial membrane, before referred to, will assist in restoring the hearing power. It is not possible to say beforehand in what cases this measure will be of value, and it is only actual trial which will tell us. Many trials must also be made sometimes before tho exact position of the artificial drumhead which will give relief is found, so that we must not conclude that becauso the first timo it is introduced the appliance fails to improve the hearing it will be useloss in that case.

In treating polypi, the first essential is to remove the growth. Various instruments have been dovised for this purpose, and each has its advocates. Where tho polypns has a distinct pedicle, probably the snare known as Wilde's, a modification of the ecraseur, will be found to bo the best instrument. In other cases, scissors, bent to a convenient shape, are more applicable, while a simplo pair of bent forceps, with toothed extremities, will frequently suffice. A vory good instrument is the small sickle-shapod knifo, which, being insinnated behind the polypns, is drawn outwards, cutting its way through tho pediclo of the growth. Toynbee devised a vory ingenious little instrument which he called the lever ring forceps, and this often effects the removal with great neatness and expedition.

Although the treatment of polypi begins with their removal, it by no means ends there. Unless energetic after-treatment be persevered in, and, sometimes, even in spite of it, the polypus will be very apt to recur. Applications of caustics must be carefully made to the spot whence the polypus has been torn. Of caustics for this purpose, probably the best is the chloro-acetic acid, applied by means of a tuft of cotton on a cotton-holder. This acid must not be instilled into the meatus, but applied to the diseased spot, and there only. Other caustic applications recommended are nitrate of silver (480 gr. to 1 ounce), strong solutions of sulphate of zinc (5 to 20 grains to 1 ounce), and undiluted liquor plumbi. In some cases, instead of removing the polypus, solutions of perchloride or persulphate of iron have been injected into its substance by means of a hypodermic syringe, with good results.

The galvano-cautery affords a good method of removing polypi and granulations; it is almost painless, and the tendency to recurrence seems to be less than after removal by other methods. Exostoses, if of very large size, may be perforated, either by means of a file, or with the aid of the drill and the dental engine, as in cases recorded by Matthewson, Field, and Lennox Browne.

Mastoid disease must be treated by early incision down to and into the bone, to give free exit to the pus. This may be accomplished by means of a knife with a short, thick, and strong blade, or by small trephines or drills. The incision should be kept open for a time by means of a tent, and the flow of pus encouraged by poulticing.

Where the symptoms point to extension of the affection inwards, with caries and exfoliation of the cochlea or other parts of the labyrinth, the first indication is to give free exit to the products of inflammation, and if the presence of dead

bone be actually recognised, to facilitate the escape of the sequestra. Not unfrequently this takes place through a sinus formed behind the auricle, and a poultice placed over this will favour the process. In these, as, indeed, in all cases of chronic suppuration in the ear, constitutional treatment must by no means be neglected. This should be of the most nutritious and supporting kind; iodide of iron, cod-liver oil and quinine as medicinal agents, with good food, eggs, meat, and milk must be freely given, while the indications for alcoholic stimulants must be met as they arise.

Of the treatment of the cerebral affections caused by otorrhœa, of phlebitis, pyæmia, pneumonia, &c., it is not necessary for me here to speak, as it must follow the rules laid down in the text-books on medicine and surgery. One thing, however, is essential, that whenever the presence of pus is ascertained in the ear a free means of exit be provided for it, in addition to any other treatment.

In concluding this account of the various forms of discharge from the ear, with their causes, complications and treatment, I must express the hope that what I have written may be of some value in calling increased attention to a distressing affection, in showing how serious may be its results if left unchecked, and in pointing out how best those results may be avoided.

FINIS.

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